(1) By adopting Euclid's construction of cutting off equal segments AD, AE from the sides and proving as he does that the triangles ABE, ACD are equal in all respects, and then making D, E coincide with A, B respectively. The method of passing to limiting cases is highly instructive, the only question being as to the advisability of trying to introduce it to beginners, except as an experiment.

(2) By drawing a duplicate DEF of the triangle ABC (this operation being only a slight extension of the method of superposition used by Euclid in I. 4), and proving first that $\angle A = \angle E$ and $\angle B = \angle F$, and second that $\angle A = \angle F$ and $\angle B = \angle E$.

(3) By *folding the triangle* so as to bring AB into coincidence with AC. This is *practically* equivalent to bisecting the vertical angle, but it replaces a "hypothetical construction" by an operation which the beginner can easily perform.

The method of folding has many obvious advantages, and much would be gained if beginners could be taught at once to recognise cases in which one half of a figure could be brought into coincidence with the other half by folding. For example, the property that the common chord of two circles is bisected at right angles by the line joining the centres is obvious when it is recognised that one half of the figure is the fold of the other half. The method is, moreover, hardly more artificial than the method of superposition which Euclid himself employs.

It should be noticed that Euclid's proof of I. 4 involves an assumption which I have never seen pointed out, namely, that *two straight lines cannot touch one another*. If this be not assumed, then when the sides DE and AB are brought into coincidence, the sides DF and AC do not necessarily coincide even though they make the same angle with the same straight line and on the same side of it. G. H. BRYAN.

The Zodiacal Light and Sun Pillars.

THE appearance on clear evenings of the zodiacal light *after* sunset at this season of the year in this latitude is usual, and it has been frequent and beautiful to observe in this district for many nights. It would be interesting if the readers of NATURE could detect any definite movement of the arm of light, for much yet remains to be discovered about this phenomenon, and any observer can make this point a study. From a short half-hour after sunset to from 8 to 9 p.m., a straight line drawn from the sun's position at sunset to the Pleiades will not remain the centre line of the zodiacal light. It appears to emanate from the sun and move as the luminous spoke of a wheel which has the sun for centre frequently, but not invariably. What makes the light apparently fade away? Is it that the motion of the earth has drawn with it the arc of volcanic or meteoric particles, which may be the medium of the light, away from the sun? or is it not possible that such a band of dust is lit with a degree of earthshine? If so, may not this account for that other phenomenon of the Gergershein, which is usually brilliant in proportion to the brilliancy of the zodiacal light? Doubtless these phenomena are always present, but their visibility depends on the magnetic or electric condition of our atmosphere. Irritated by either of these conditions, the belts of dust would alter positions of all the bodies forming them, and so lie at a different angle and be clearer or dimmer accordingly.

The very remarkable sunset of March 6 has probably been observed by many readers of NATURE. The "fire-finger" left in a perfectly perpendicular position for upwards of fifty minutes after sunset was visibly withdrawn, without losing colour or size or changing from the perpendicular, and was a vivid and beautiful adjunct to a sunset afterglow strangely reminding one of the "Krakatoa sunsets" of years ago. This finger of fire the writer has only observed once before, after a similar-coloured sunset over the estuaries of the Medway and Thames last summer, but London smoke dimmed the effect. This rare appearance seemed on March 6 to resolve or be replaced by five vivid *white* rays with slight wheel motions from north to south, the largest of which eventually seemed the zodiacal light itself.

GUY J. BRIDGES.

Sutton Mandeville Rectory, Salisbury.

A PHENOMENON was visible here this evening which I think deserves to be recorded. We have an uninterrupted view of the western sky, and about a hundred pairs of sharp eyes are available, so that any unusual sunset is pretty certain to be noticed. Solar halos are comparatively common occurrences, and I have come to the conclusion that lunar rainbows are not so rare as is believed, but the "pillar of fire" which has been visible here for at least forty minutes is the most brilliant sight I or any of my oldest friends have ever witnessed. It was first observed at 6 p.m. just after the sun had disappeared, and was exactly *vertical* over the sun. The colour was at first silvery (resembling a searchlight) and later a golden yellow, the width equal to the sun's diameter, and the length 18° to 20°. A few light clouds seemed to pass *behind* it. Some observers noted a flickering and also a swaying motion, but this may have been an optical effect. At about 6.30 the colour had changed by gradations into a deep crimson-red, and for the next ten minutes it gradually became deeper in colour and shorter, disappearing at 6.40.

I may add that on February 20, 1901, I observed a very faint trace of a similar phenomenon.

Can any of your readers direct me to any literature bearing on the matter? WM. A. KNIGHT.

Sexey's Trade School, Bruton, Somerset, March 6.

The Quadrantid Meteors.

MR. JOHN R. HENRY, according to his letters in NATURE of January 2 and 23, unfortunately looked out too late for the Quadrantids, owing to having miscalculated the time of maximum, the approximate probable time of which might also have been obtained from the British Astronomical Association. He is right in saying that the date of the shower is advancing into the year, but the advance is slower than he thinks. Taking the data he gives, which, however, are only very rough, and also a consideration of the sun's longitude as given in the "Nautical Almanac," there is an advance of only five hours in the thirty-seven years 1825 to 1862. It would appear that in the forty years from then a further advance of probably about eight hours has taken place. It is unfortunate that Prof. A. S. Herschel has not published the exact number of meteors he saw from hour to hour on January 2, 1900, when he watched from 11h. to 16h. 30m. He, however, states that the frequency continued about the same during the whole period, and seeing the radiant point was rising all that period, this would mean that the maximum was near the beginning of his watch.

Mr. Henry may be right in saying that the period of maximum fluctuates somewhat from year to year, though the data he gives are not sufficiently accurate to prove this; but I fail to see what ground he had for expecting the maximum so late as he did this year. Taking all the data into consideration, we might have expected the maximum to be about 23h. on the 2nd. I see no reason to doubt that this expectation was fulfilled; but as the maximum would occur in the daytime, observations in other countries would be necessary to prove this. The Quadrantids as seen here were most numerous on that morning.

It seems probable, therefore, that the time of the next maximum will be about 5h. on January 3, 1903. T. W. BACKHOUSE.

West Hendon House, Sunderland, March 5.

Elementary Mathematics.

I WAS very glad to read in NATURE of January 30 (p. 297) the letter of Mr. J. W. Marshall on elementary mathematics, because all his suggestions referring to elementary algebra have already been realised in my book, "Applied Algebra," published in 1900 at St. Petersburg, in Russian.

I send, therefore, two copies of my book, one for the editor, the other for Mr. Marshall. The algebraical characters will permit every mathematician to judge somewhat of the character of a mathematical book without a knowledge of the Russian language. My compatriots have already condemned my heresy; but I hope that my ex-compatriots (our family is of Scottish origin, derived from Lehrmouth) will judge more liberally my attempt to improve the old method of teaching the prolific science of algebra.

The peculiarities of my exposition are explained by the fact that I wished to say all that was needed, and only what was needed. For that purpose it was necessary to put in the first place the systematical exposition of all the most fundamental methods of algebra which are sufficient for ordinary applications, and to postpone to a supplement all complicated questions that are usually combined with fundamental notions in the existing manuals, only producing a confusion in the minds of the pupils.

© 1902 Nature Publishing Group

Before attempting to expound a new section, I endeavour to explain the purpose which this section serves, for as King Solomon stated: "A fool hath no delight in understanding, but that his heart may discover itself." (Prov. xviii. 2.)

In small type I have given many of the explanations that a good teacher requires with his pupils in the class room, but never includes in his printed manual. This peculiarity makes my book useful for self-instruction.

The beginning of all mathematical study is easy. The difficulty begins later, because it is indispensable to know what has already been studied for the understanding of what follows. Therefore my arrangement permits even the youngest pupils to learn something applicable to the practice of calculation.

WALDEMAR LERMANTOFF.

University of St. Petersburg, Russia.

THE NATIVE QUESTION IN SOUTH AFRICA.[1]

IT cannot be too often repeated or too strongly impressed on the public mind of this country that by far the most difficult problem of South Africa is, not that of the relations of the white populations to one another, but that of the relations of the white population to the "Natives," and of the Natives to one another. It involves questions not to be solved by any process of patching. The ordinary "short view" recommended by European statesmen in treating European problems will not do. To deal with these questions effectually, considerations of a far-reaching economic and anthropological character are necessary. We must understand the Native mind, we must endeavour to see things from the Native point of view, we must consider the Native prejudices and aspirations as well as what we, from our point of view, regard as the Natives' best interests, and we must take into account their physiological and mental condition, and the influence upon it of the changes which have begun and the further changes impending.

It is thus evident that, before any final steps can be taken, a full inquiry into these matters must be held. Until the end of the war such an inquiry would be difficult. Consequently, all that can be done at present is to legislate on the most urgent points, so as to obtain a temporary *modus vivendi* on the labour contracts and the liquor laws. This is all that Lord Milner has yet attempted. But his despatches to the Colonial Secretary, and the important memorandum by Sir Godfrey Lagden, comprised in the papers recently presented to Parliament, though relating chiefly to the proclamations on the two subjects just mentioned, disclose the fact that the authorities are not insensible to the wider principles which must underlie our future policy. Lord Milner fully recognises the need of uniformity throughout British South Africa, and looks forward to a Native code to be framed by a Federal Parliament. It is satisfactory to learn from him that "the best colonial sentiment" as to our treatment of the Natives "is not far removed from the best home sentiment, as represented, for instance, by temperate and reasonable advocates of Native rights," such as the authors of "The Natives in South Africa," reviewed in these columns last May. What is wanted is that such sentiment should be controlled and directed by full and accurate information.

The Anthropological Institute and the Folklore Society have already petitioned Mr. Chamberlain to order a full and systematic inquiry into the Native laws and customs in our new colonies at the earliest possible moment. The authors of the book just referred to, whom Lord Milner mentions with so much approval, speak of the want of such an inquiry as "urgent." It is the only satisfactory way to provide the information required for the guidance of public sentiment, and of the administration; and if the example of Cape Colony be of value, it must precede any comprehensive attempt at legislation. The readers of NATURE are primarily interested in its scientific aspect. It is needless to reproduce the arguments they have had before them more than once. Those arguments are reinforced by Lord Milner's protests against some of the statements made on behalf of the Anti-Slavery Society and the Aborigines Protection Society in these papers, and by Sir Godfrey Lagden's admission that "there is much yet to be learnt by those who are vested with the control of Native affairs." And, though there is no allusion to the matter in the despatches now printed, we may be allowed to indulge the hope that it will not be overlooked as soon as the country is sufficiently pacified to enable the Government to arrange for it. Meanwhile, every opportunity should be taken by scientific anthropologists and jurists to bring their views before ministers and members of Parliament.

---

[1] "Transvaal. Papers relati[illegible] to Legislation affecting Natives in the Transvaal." Presented to Parliament, January 1902.

THE JUBILEE OF THE AUSTRIAN METEOROLOGICAL CENTRALANSTALT.

TO celebrate the fiftieth year of the existence of the Central Institute for Meteorology and Earth's Magnetism, the Vienna Academy has published a jubilee volume,[1] the contents of which form a very valuable contribution to science and an appropriate publication for this important celebration. This Central Institute, which is now the hub of all the meteorological and magnetic work carried on in the Austrian Empire, came into existence on July 23 in the year 1851, and it was founded with the object, first, of coordinating a number of stations all over the country and making them work on a uniform plan, and, second, of collecting such observations. How well these two objects have been carried out is familiar to every meteorologist of to-day, and so successful an issue of this organisation has been due to the consecutive labours of such directors as Kreil, Jelinek, Hann and Pernter, who have kept the Institute in such an excellent state of efficiency.

In the present volume we are first made acquainted with a brief history of the events which led up to the formation of the Institute, and the progress made during the period of office of each director. This is written in the form of an introductory chapter by the present director, Prof. Pernter. It is interesting to read that in the year 1851 Director Kreil had only forty stations working on a uniform plan carefully prepared by the Institute, but eleven years later he had increased the number nearly threefold. At this early stage there was a great amount of work to be accomplished, and Kreil, among other things, brought out the useful and valuable year book which was considered at the time a "modèle a suivre." The collection of old observations formed an important duty at this period of the Institute's history, and the first few volumes published contained long series of valuable observations made at Wien (1775–1850), Mailand (1763–1850), Prag (1775–1851), Kremsmünster (1763–1851), Salzburg (1842–1851), Udine (1803–1842), Fünfkirchen (1819–1832), Stanislau (1839–1850), and several other stations.

As time went on, the Institute, like many others, began rapidly to accumulate more work than it could accomplish, and this necessitated an increase in the staff and a greater output of publications. By the year 1877, 238 stations were sending in their results, while twenty years later this number had increased to 447; last year the number of first, second and third class stations together was 420.

To come now to the series of valuable articles which form the substance of this large volume, it may, in the

---

[1] "Denkschriften der kaiserlichen Akademie der Wissenschaften." *Mathematisch-Naturwissenschaftliche Classe*, vol. lxxiii.

© 1902 Nature Publishing Group